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the fact that the extreme judgments appeared to be more constant than the moderate ones lay in the conditions of the experiment. If the first judgment upon a color has been a moderate one, there are three possibilities with regard to the second: it may express the same affective value as the first, or a greater affective value, or a less one. If on the other hand the first judgment has assigned either the highest or the lowest affective value to a color, there are only two possibilities with regard to the second judgment: it may be the same as the first, or it may vary from it in one direction only. It naturally follows that the percentage of cases showing no change will, if there is no constant tendency present, be greater where the first judgment has assigned the highest or the lowest affective values.

## XV. A NOTE ON THE AFFECTIVE VALUES OF COLORS

By M. F. WASHBURN

In the preceding study each of thirty-five observers was required to record in numerical terms her judgment on the pleasantness or unpleasantness of ninety colors, each color being presented in the form of a paper square 2.9 cm. a side, on a white background, and looked at for ten seconds. From the results thus obtained the verdicts of the different observers on a given color have been selected out, and their average calculated together with the mean variation. The whole series contained ninety saturated colors besides two tints and two shades of each color. To avoid what seemed unnecessary labor, the calculations to be discussed were made only for the lighter tint and the darker shade of each color: thus for eighteen tints and eighteen shades.

It appears that for our thirty-five observers, all women and nearly all college students, *the affective value of the tints is highest* (average from all observers, 4.7); *that of the shades is next* (average from all observers, 4.1), *and that of the saturated colors is lowest* (average from all observers, 3.6). Further, *that the affective reaction to saturated colors, whether pleasant or unpleasant, is more positive than that to shades and tints, and that to tints more positive than that to shades*, is indicated by the fact that the total number of judgments '4' (indifferent) is for saturated colors, 50; for tints, 89, and for shades, 101.

Among saturated colors, the order of increasing pleasantness, together with the average affective value assigned to each color by our observers, is as follows: green yellow, 2.1; orange and yellow green, 2.6; red violet and green, 3; yellow, 3.3; yellow orange and blue green, 3.4; red orange, 3.6; violet red, 3.7; violet blue and blue, 3.8; orange yellow and blue violet, 4; violet, 4.4; orange red, 4.5; green blue, 5.3; red, 5.6. *Pure red is the pleasantest saturated color, and green blue comes next. There is a tendency to dislike yellows and yellow greens.*

Among tints, the order of increasing pleasantness is the following: violet red, 3.4; green yellow, 3.8; orange, 4.3; yellow and orange yellow, 4.4; yellow orange, 4.5; blue green, red orange, and red, 4.6; green blue and orange red, 4.7; green, 4.3; yellow green, 5; violet blue, 5.1; blue violet, 5.5; red violet and violet, 5.9; blue, 6. *Blue is the pleasantest light tint, and indeed the pleasantest color in the whole series.*

Among shades, we have the following order of increasing pleasantness; yellow, 2.3; orange yellow, 2.7; blue green, 3.7; red violet, green yellow, yellow orange, and orange, 3.8; violet red, 3.9; red orange and orange red, 4.3; violet, 4.4; blue violet, green blue, and green, 4.5; red and violet blue, 4.8; blue, 5; yellow green, 5.3. *Yellow green is the pleasantest dark shade and blue comes next.*

It might seem that a study of the mean variations of these averages

would be of interest, as indicating the amount of unanimity in the tastes of our observers. But further thought reveals the fact that the mean variations are necessarily involved with the degree of pleasantness or unpleasantness indicated by the averages, and can have no independent significance. The smallest mean variations must belong to the highest and lowest averages, the largest mean variations to the averages of medium amount. For evidently if the average affective value of a color is four, the mean variation of that average may rise as high as three, since judgments from one to seven are possible: but if the average affective value of a color is six or two, the mean variation can hardly rise above one and a fraction, since there can be no judgments above seven or under one.